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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,407	01/23/2004	Shenggao Liu	005950-844	9511

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EXAMINER	
HAMILTON, CYNTHIA	

ART UNIT	PAPER NUMBER
1795	

NOTIFICATION DATE	DELIVERY MODE
10/26/2007	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/764,407	LIU ET AL.	
	Examiner	Art Unit	
	Cynthia Hamilton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *3/1/2007, 4/13/2007,9/14/2006*.

2a)☒ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *43-49,52-57,59-62,65-69,71 and 73-80* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *67-69* is/are allowed.

6)☒ Claim(s) *43-49,52-57,59-62,65,66,71 and 73-80* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *43-49,52-57,59-62,65-69,71 and 73-80* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/1/7, 4/13/7*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on March 1, 2007 and April 13, 2007 has been entered.

2. Applicants have cancelled claims 1-42, 50-51, 58, 63-64, 70, 72 and 80-96. This is inclusive of all of the non-elected claims set forth in the last Office Action. All the claims that remain are part of the originally elected invention of Group VI, claims 43-83. Thus, applicants have removed issues with respect to traversed election of June 15, 2005 by removing all claims directed to non- elected groups.

3. Claims 43, 45-49, 52-57, 60-61, 73/{43, 47, 54}, 74/{43, 47, 54}, 75/{43, 47, 54}, 77/75/{43, 47, 54}, 78/{43, 47, 54}, 79/{43, 47, 54}, and 80/{43, 47, 54} are rejected under 35 U.S.C. 102(e) as being anticipated by Dammel (2005/0147915 A1). With respect to instant claims 43, 45-49, 52-57, 60-61, 73/{43, 47, 54}, 74/{43, 47, 54}, 75/{43, 47, 54}, 77/75/{43, 47, 54}, 78/{43, 47, 54}, 79/{43, 47, 54}, and 80/{43, 47, 54}, Examples 5-7 of Dammel present compositions which are species that anticipate the instant compositions. A rough comparison in table form is given below.

	Example 5			
monomer used		mole %		instant
2-methyl-2-adamantane methacrylate	MAdMa	40%	b adamantane	b

alpha-gamman butyrolactone methacrylate	GBLMA	35%	P	a
diamantane	mixture hydroxydiamantane methacrylates	25%	C diamantanes	c
additives	triphenylsulfononium nonafluorobutane sulfonate (TSP-Nf)		photoacid gen	2%
	diethanolamine		base	
	pgmea		solvent	
	Fc-443 surfactant			
	claims			
	43, 45-49, 52-57, 60-61,73-75, 77-80			
	Example 6			
	3-methyl-3diamantane methacrylate	40%		c
alpha-gamma butyrolactone methacrylate	GBLMA	35%	p	a
hydroxyadamantane methacrylate	HAdMA	25%		b
additives	triphenylsulfononium nonafluorobutane sulfonate (TSP-Nf)		photoacid	2%
	diethanolamine		base	
	pgmea		solvent	
	Fc-443 surfactant			
	claims			103
	43, 45-47, 49, 52-53, 54, 56-57, 60-61, (73-75, 77-80)/43'47'54'			44
	Example 7			
	3-methyl-3 diamantane methacrylate	40%	c	

alpha-gamma butyrolactone methacrylate	GBLMA	35% a	p
	isomeric hydroxydiamantane methacrylates	25% c	
	claims 43, 45-47, 49, 52-54, 56-57, 60-61, (73-75, 77-80)/43'47'54		

"A generic claim cannot be allowed to an applicant if the prior art discloses a species falling within the claimed genus." The species in that case will anticipate the genus. *In re Slayter*, 276 F.2d 408, 411, 125 USPQ 345, 347 (CCPA 1960); *In re Gosteli,* 872 F.2d 1008, 10 USPQ2d 1614 (Fed. Cir. 1989). The examiner found insufficient support for these instant claims in US Provisional application 60/508222 to meet the requirements of 35 USC 112, thus the effective filing date for all of the instant claims under rejection in this paragraph is January 23, 2004.

1. Claims 43-49, 52-57, 59-62, 65-66, 73/[43, 47, 54 or 62] to 80/[43, 47, 54 or 62] rejected under 35 U.S.C. 103(a) as being unpatentable over Dammel (US 2005/0147915 A1). Dammel teaches the instant invention wherein photoresist compositions set forth in Examples 1-3 teach all but the specific percentages of acid cleavable monomers, adamantanes, diamantanes, triamantanes and cyclic lactone triamantanes which are set forth in [0045]. However, the use of any of the acrylates or methacrylates formed from the triamantanes and diamantanes of Dammel's figures 1-9 would have been prima facie obvious in view of the teachings of Dammel et al to do so in the percentages set forth in [0070] wherein they are present in a most preferred range of 55 to 30 mole % as "higher adamantane containing monomers" with the rest being acid labile group monomers and others as set forth on pages 7-8. The additives for the photoresist are inclusive of the acid generating compounds set forth in [0072], the solvents set forth in [0073], the additives set forth in [0074-0075] as well as the examples of Dammel et al. Thus, with

respect to instant claims 43-49, 52-57, 59-62, 65-66, 73/[43, 47, 54 or 62] to 80/[43, 47, 54 or 62], the compositions of Dammel et al make prima facie obvious the instant compositions in the ranges of monomers set forth because In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Werthheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); *In re Woodruff*, 919 F.2d 1575, 16 UAPQ2d 1934 (Fed. Cir. 1990). See particularly MPEP 2144.05.

2. Claims 43-49, 52-57, 59-61, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), 80/(43,47,52), 81/ (43,47,52), and 82/(43,47,52) are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoai et al (6,245,485 cited by applicants) in view of Liu et al (WO 02/057201 A2). With respect to instant claims 43-49, 52-57, 59-61, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), Aoai et al teach species of the instant invention but for c being greater than zero in the instant resin. What Aoai et al teach is a positive resin composition having a polycyclic alicyclic group and a carboxyl group and a compound generating an acid. The object of Aoai et al is stated to be in col. 3, lines 40-52:

Accordingly, the object of the present invention is to provide a positive resist composition suitable for the exposure using a light source of 220 nm or less, particularly an ArF excimer laser beam (193 nm). More specifically, the object of the present invention is to provide a positive resist composition which ensures, on use of an exposure light source of 220 nm or less, high sensitivity, good resolution, sufficiently high resistance against dry etching, satisfactory adhesion to the substrate, and superior developability even with a developer conventionally used for resists (for example, a 2.38% aqueous tetramethylammonium hydroxide solution).

In col. 5, lines 5-8 of Aoai et al, the positive resist composition is disclosed to be the resin (1) as component (B) further containing a group capable of decomposing by the action of an cid to

increase solubility in a alkali developer. In the paragraph bridging col. 3-4, resin (B) is described as having a "polycyclic-type alicyclic group" and a carboxyl group. In col. 10, lines 40-46, the "polycyclic-type alicyclic group" is disclosed as preferably an alicyclic group having 5 or more carbon atoms, which may have a substituent, such as ... a tetracyclo-alicyclic group, more preferably having from 6 to 30 carbon atoms, still more preferably from 7 to 25 carbon atoms, which may have a substituent." Further, working examples of the positive resins of Aoai et al have as (B) resin at col. 87-89, those with adamantane groups. Thus, the smallest diamondoid structure is made of use by Aoai et al with acid degradeable units such as in p-6 resin and p-8 resin. These alicyclics in Aoai et al are used over aromatic groups because they are more transparent at the smaller wavelengths used for imaging and have etch resistance like the aromatics thus helping the transparency while keeping the etch resistance. In Aoai et al, see particularly the Abstract, paragraph bridging col. 2-3, col. 3, col. 9, lines 20-34, col. 9, lines 65-68, col. 10, lines 40-46, and col. 19, lines 50-65. With respect to the use of diamantane or triamantane or higher diamondoid resins as resin (B) in Aoai et al, Liu et al teach on page 107, lines 5-19, that the higher diamondoids have etch resistance moieties like the adamantane polymers and would be expected to have even better glass transition temperatures and high deposition temperatures. Thus, with respect to instant claims 43-49, 52-57, 59-61, 75/(43,47,52), 77/(43,47,52), 78/(43,47,52), 79/(43,47,52), the use of any of the diamondoid family for the "polycyclic-type alicyclic group" in Aoai et al would have been prima facie obvious to obtain even better etch resistance while maintaining the transparency needed. Diamantyl groups have 14 carbon atoms, triamantyl groups have 18 carbon atoms, tetramantanes have 22 carbon atoms, pentamantanes have 26 or 25 carbons and hexamantanes have 26, 29 or 30 carbon atoms as

shown by Liu et al in Fig 1.A. Liu et al in Example 73, pages 105-106 discuss the advantages of transparency using their diamondoids. On pages 75-86, Liu et al teach how to form the esters of the diamondoids from dibromonated or mono brominated diamondoids inclusive of acrylated diamondoids. The teachings of Aoai et al with respect to adamantyl groups then the higher diamondoids makes prima facie obvious the range from adamantyl through the higher diamondoids would work as transparent etch resistant groups for the chemically amplified positive resists known in the art. With respect to instant claims 75 and 77-78, the compounds taught by Aoai et al to be decomposable to acid on irradiation of an active light ray or radiation are inclusive of all of those set forth starting at the bottom of col. 64 and going to col. 81. With respect to instant claim 79, in col. 81, starting in line 23, Aoai et al teach the optional use of acid decomposable dissolution inhibing compounds, dyes, plasticizer, surface active agent, photosnsitizer, organic basic compound d and a compound which accelerates the solubility of the developers. With respect to instant claim 80, the solvents taught by Aoai et al for their photoresists are set forth in col. 84, lines 7-20 and are as follows:

ethylene dichloride, cyclohexanone, cyclopentanone, 2-heptanone, .gamma.-butyrolactone, methyl ethyl ketone, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, 2-methoxyethyl acetate, ethylene glycol monoethyl ether acetate, propylene glycol monomethyl ether, propylene glycol monomethyl ether acetate, toluene, ethyl acetate, methyl lactate, ethyl lactate, methyl methoxypropionate, ethyl ethoxypropionate, methyl pyruvate, ethyl pyruvate, propyl pyruvate, N,N-dimethylformamide, dimethyl sulfoxide, N-methylpyrrolidone and tetrahydrofuran. Thus, the use of any of these solvents and additives with the resists of Aoai et al would have been prima facie obvious.

3. Claims 73/43 and 73/62 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention. Claim 73 recites the limitation "any of the diamondoid containing monomers"" in line 2. There is insufficient antecedent basis for this limitation in the claims 43 and 62 when claim 73 depends upon them. No monomer is cited in claims 43 and 62.

4. Claims 47-49, 54-57, 59-61 and claims 73-80 as dependent upon claims 47 and 54 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have amended claim 47 to have a "base resin having a monomer with a diamondoid-containing pendant group higher than adamantane, the base resin represented by the general formula:". The amendment to claim 54 is essentially the same. It is unclear if the base resin is made from the monomer in question or has a monomer added to the polymer set forth. The use of monomer when referencing a polymer is found confusing at this point.

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

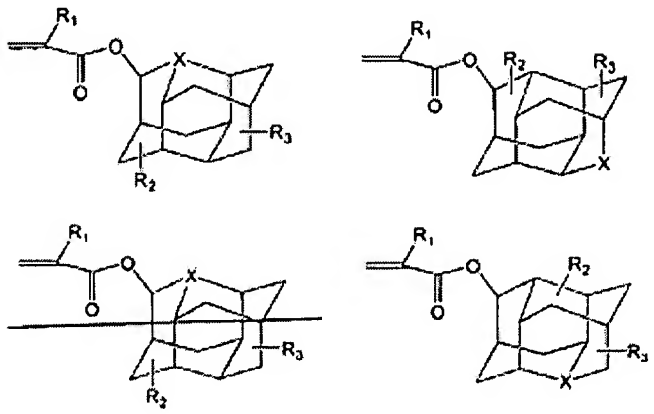
> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 47-49, 54-57, 59-61 and claims 73-80 as dependent upon claims 47 and 54 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no disclosure found to the mixing of a monomer with the polymer of claims 47-49, 54-57, 59-61 and claims 73-80 as dependent upon claims 47 and 54. If applicants meant that the polymer was only inclusive of such polymer as made from such monomers then there is support for that as cited by

applicants. Because the meaning of the claim language is unclear, this rejection with respect to support is made.

7. Claim 71 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 71 is as follows:

71. (Currently amended) ~~The photoresist composition of claim 70, wherein the~~ A positive-acting photoresist composition comprising a base resin ~~is~~ polymerized from any of the following monomers:



wherein R_1 is selected from the group consisting of –H and $–CH_3$;

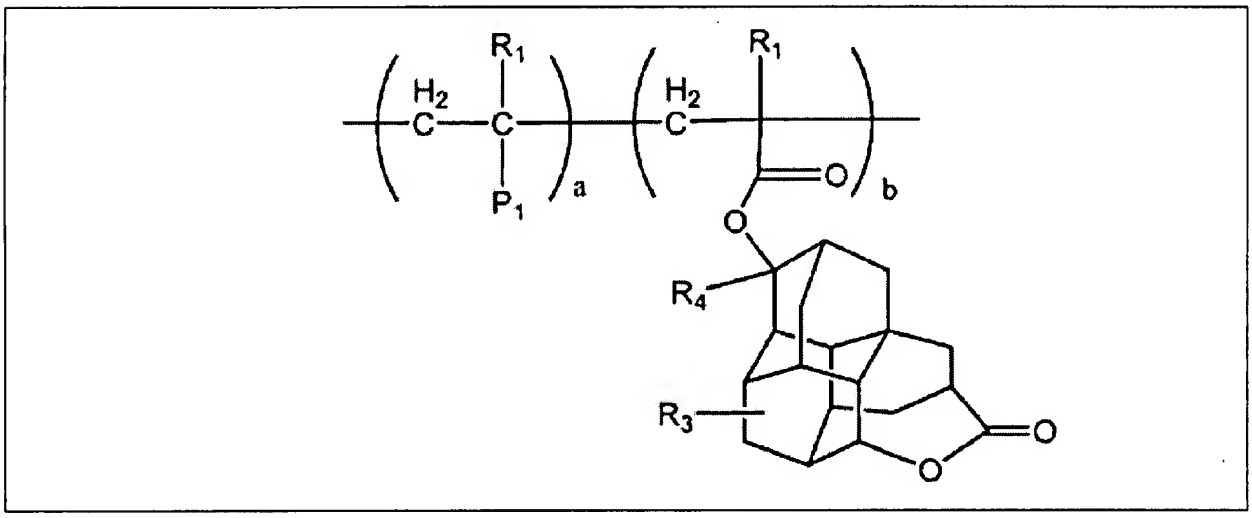
R_2 is selected from the group consisting of –H, an alkyl group having from 1 to 4 carbon atoms, and an alkoxy group having from 1 to 4 carbon atoms;

R_3 is –H, or a hydrophilic-enhancing moiety selected from the group consisting of a hydroxyl group –OH, a keto group =O, carboxylic acid group –COOH, and alkoxy group –OR_4, and a group $–OC(O)OR_4$;

R_4 is $–CH_3$ or $–C_2H_5$;

X is selected from the group consisting of oxygen, nitrogen, boron, and sulfur.

.The sole required member of the composition of claim 71 is the base resin described. The examiner found no indication within the specification or original claims as to how to make the diamantane like "heterodiamondoid" groups wherein X is oxygen, nitrogen, boron or sulfur. Since by applicant's own admission there is little or no art on the diamantane derivatives, the worker of ordinary skill in the art would not be aware of how to make the heterodiamondoids of claim 71 in order to make the base resin required for the composition. Thus, the original specification and claims are held non-enabling with respect to the ability to make the base resin required. The examiner notes that X= C(=O)O- as seen in claim 62 as shown below:



is not the same as X=O and does not yield a diamondoid structure as found in claim 71 wherein X is one atom and one atom only in the ring structure. A showing of sufficient fact as to how the worker of ordinary skill in the art would know from the instant specification as well as the prior art how to make the base resins of claim 71 would remove this rejection.

8. Claims 67-69 are allowed.

9. All claims are drawn to the same invention claimed in the application prior to the entry of the submission under 37 CFR 1.114 and could have been finally rejected on the grounds and art

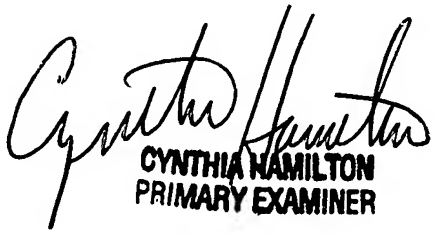
of record in the next Office action if they had been entered in the application prior to entry under 37 CFR 1.114. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action after the filing of a request for continued examination and the submission under 37 CFR 1.114. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Hamilton whose telephone number is 571-272-1331. The examiner can normally be reached on Monday through Friday 8:30 am to 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia H. Kelly can be reached on (571) 272-0729. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Cynthia Hamilton
Primary Examiner
Art Unit 1795

October 22, 2007